① $3a^2-15a+12$
$(3a-3)(a-4)$

② $2b^2-6b-20$
$2(b^2-3b-10)$
$2(b-5)(b+2)$

③ $2a^2+10a-28$
$2(a^2+5a-14)$
$2(a+7)(a-2)$

④ $2r^3-4r^2-6r$
$2r(r^2-2r-3)$
$2r(r-3)(r+1)$

⑤ $3x^3+15x^2+12x$
$3x(x^2+5x+4)$
$3x(x+4)(x+1)$

⑥ $2m^3-2m^2-40m$
$2m(m^2-m-20)$
$2m(m-5)(m+4$

⑦ $3x^3-3x$
$3x(x^2-1)$
$3x(x+1)(x-1)$

⑧ $3a^3-27a$
$3a(a^2-9)$
$3a(a+3)(a-3)$

⑨ $4m^3-100m$
$4m(m^2-25)$
$4m(m+5)(m-5)$

⑩ $x^2-13x+30$
$(x-10)(x-3)$

⑪ $4a^2-24a+20$
$4(a^2-6a+5)$
$4(a-5)(a-1)$

⑫ $2a^2+13a-7$
$(2a-1)(a+7)$

⑬ $5n^2-10n$
$5n(n-2)$

⑭ $6p^2-12p$
$6p(p-2)$

⑮ $2b^2+4b$
$2b(b+2)$

⑯ $2t^3-14t^2+24t$
$2t(t^2-7t+12)$
$2t(t-4)(t-3)$

⑰ $6g^3-28g^2-10g$
$2g(3g^2-14g-5)$
$2g(3g+1)(g-5)$

⑱ $6r^3-3r^2-30r$
$3r(2r^2-r+10)$

⑲ $5a^2-35a+50$
$5(a^2-7a+10)$
$5(a-5)(a-2)$

⑳ $2a^3+16a^2+30a$
$2a(a^2+8a+15)$
$2a(a+5)(a+3)$

㉑ $12w^2+33w-9$
$3(4w^2+11w-3)$
$3(4w-1)(w+3)$

㉒ $2z^2-7z-15$
$(2z+3)(z-5)$

㉓ $4y^2+7y-2$
$(4y-1)(y+2)$

㉔ $5x^3-20x$
$5x(x^2-4)$
$5x(x+2)(x-2)$

㉕ $2y^2+20yz+18z^2$
$2(y^2+10yz+9z^2)$
$2(y+9z)(y+z)$

㉖ $2m^2-2mn-40n^2$
$2(m^2-mn-20n^2)$
$2(m-5n)(m+4n)$

㉗ $3x^2-9xy-30y^2$
$3(x^2-3xy-10y^2)$
$3(x-5y)(x+2y)$

㉘ $3x^2-75y^2$
$3(x-25y^2)$
$3(x+5y)(x-5y)$

㉙ $4a^2-4b^2$
$4(a^2-b^2)$
$4(a+b)(a-b)$

㉚ $12g^2-75k^2$
$3(4g^2-25k^2)$
$3(2g+5k)(2g-5k$

㉛ $8r^2+4rt-30t^2$
$2(4r^2+2rt-15t^2)$

㉜ $6m^2-9mn-15n^2$
$3(2m^2-3mn-5n^2)$
$3(2m-5n)(m+n)$

㉝ $8m^2-24mn+18n^2$
$2(4m^2-12mn+9n^2)$
$2(2m-3n)(2m-3$

㉞ $6x^2-3x-63$
$3(2x^2-x-21)$
$3(2x-7)(x+3)$

㉟ $121a-49a^3$
$-a(-121+49a^2)$
$-a(7a+11)(7a-11)$

㊱ $3p^4-5p^3-28p^2$
$p^2(3p^2-5p-28)$
$p^2(3p+7)(p-4$

㊲ $30e^3+22e^2-28e$
$2e(15e^2+11e-14)$
$2e(5e+7)(3e-2)$

㊳ $30r^3-9r^2-12r$
$3r(10r^2-3r-4)$
$3r(10r^2-8r)(5r+4)$
$3r\ 2r(5r-4)\ 1(5r-4)$
$3r(2r+1)(5r-4)$

㊴ $10b^3+34b^2-24b$
$2b(5b^2+17b-12)$
$2b(5b^2+20b)(-3b-1$
$2b\ 5b(b+4)-3(b+4)$
$2b(5b-3)(b+4)$

(40) $a^2b^3 - 25b$

$b(a^2b^2 - 25)$

$b(ab+5)(ab-5)$

(41) $r^3 - 5r^2t + 4rt^2$

$r(r^2 - 5rt + 4t^2)$

$r(r-4t)(r-t)$

(42) $x^3y - xy^3$

$xy(x^2 - y^2)$

$(xy)(x+y)(x-$

(43) $x^3 - 3x^2y + 2xy^2$

$x(x^2 - 3xy + 2y^2)$

$x(x-2y)(x-y)$

(44) $3a^3b + 13a^2b^2 - 3ab^3$

$ab(3a^2 + 13ab - 3b^2)$

(45) $12m^3y - 75m$

$3my(4m^2 - 25y^2$

$3my(2m+5y)(2m-$

(46) $10x^3y + 21x^2y^2 + 9xy^3$

$xy(10x^2 + 21xy + 9y^2)$

$xy(10x^2 + 15xy + 6xy + 9y^2)$

$xy\ 5x(2x+3y)\ 3y(2x+3y)$

$xy(5x+3y)(2x+3y)$

(47) $2a^3b + 11a^2b^2 - 21ab^3$

$ab(2a^2 + 11ab - 21b^2)$

$ab(2a-3b)(a+7b)$

(48) $6x^3y + 7x^2y^2 - 20xy$

$xy(6x^2 + 7xy - 20y^2$

$xy(3x-4y)(2x+5y$

(49) $2x^4 - 512$

$2(x^4 - 256)$

$2(x^2+16)(x^2-16)$

$2(x^2+16)(x+4)(x-4)$

(50) $243 - 3y^4$

$3(81 - y^4)$

$3(9+y^2)(9-y^2)$

$3(9+y^2)(3+y)(3-y)$

(51) $625m^4 - 16$

$(25m^2+4)(25m^2-4$

$(25m^2+4)(5m+2)(5m$

(52) $x^5 - 32x^3 + 256x$

$x(x^4 - 32x^2 + 256)$

$x(x^2-16)(x^2-16)$

$x(x+4)(x-4)(x+4)(x-4)$

(53) $2a^4 - 26a^2 + 72$

$2(a^4 - 13a^2 + 36)$

$2(a^2-9)(a^2-4)$

$2(a+3)(a-3)(a+2)(a-2)$

(54) $4r^4 - 29r^2 + 25$

$(4r^2-25)(r^2-1$

$(2r+5)(2r-5)(r+1)(r-$

(55) $3a^4 - 75a^2 + 432$

$3(a^4 - 25a^2 + 144)$

$3(a^2-9)(a^2-16)$

$3(a-3)(a+3)(a+4)(a+4)$

(56) $3t^5 - 60t^3 + 192t$

$3t(t^4 - 20t^2 + 64)$

$3t(t^2-16)(t^2-4)$

$3t(t-4)(t+4)(t-2)(t+2)$

(57) $8y^6 - 50y^4 + 72y^2$

$2y^2(4y^4 - 25y^2 + 36)$

$2y^2(4y^4 - 16y^2 - 9y^2 + 36$

$2y^2\ 4y^2(y^2-4) - 9(y^2-4)$

$2y^2(2y+3)(2y-3)(y-2)(y+$

(58) $x^4 - 13x^2y^2 + 36y^4$

$(x^2-9y^2)(x^2-4y^2)$

$(x-3y)(x+3y)(x-2y)(x+2y)$

(59) $16a^4 - 625b^4$

$(4a^2-25b^2)(4a^2+25b^2)$

$(2a-5b)(2a+5b)(4a^2+25b^2)$

(60) $2x^5y - 20x^3y^3 + 18xy^5$

$2xy(x^4 - 10x^2y^2 + 9y^4)$

$2xy(x^2-9y^2)(x^2-1y^2)$

$2xy(x-3y)(x+3y)(x-y)(x+y$

(61) $x^5y - 18x^3y^3 + 81xy^5$

$xy(x^4 - 18x^2y^2 + 81y^4)$

$xy(x^2-9y^2)(x^2-9y^2)$

$xy(x-3y)(x+3y)(x-3y)(x+3y)$

or

$xy(x-3y)^2(x+3y)^2$

(62) $2x^5y + 34x^3y^3 + 32xy^5$

$2xy(x^4 + 17x^2y^2 + 16y^4)$

$2xy(x^2+16y^2)(x^2+1y^2)$

(63) $x^5y - 53x^3y^3 + 196xy$

$xy(x^4 - 53x^2y^2 + 196y^4)$

$xy(x^2-49y^2)(x^2-4y^2)$

$xy(x+7y)(x+7y)(x-2y)(x+2y$